

Claim Amendments

1. (Currently Amended) A spin-valve type magnetoresistance sensor comprising:
- a free ferromagnetic layer;
 - a pinned ferromagnetic layer;
 - a non-magnetic spacer layer ~~which is~~ sandwiched between the free ferromagnetic layer and the pinned ferromagnetic layer;
 - an anti-ferromagnetic layer ~~which is~~ disposed adjacent to the pinned ferromagnetic layer;
 - a non-magnetic back layer ~~which is~~ disposed adjacent to the free ferromagnetic layer and ~~which is stacked on the opposite a~~ side of the free ferromagnetic layer ~~from~~ opposite the non-magnetic spacer layer; and
 - an electron-reflective layer ~~which is~~ disposed adjacent to the non-magnetic back layer and ~~which is stacked on the opposite a~~ side of the non-magnetic back layer ~~from~~ opposite the free ferromagnetic layer.
- A²
2. (Currently amended) The sensor of claim 1, wherein the anti-ferromagnetic layer is used to ~~pin the direction of magnetization of the pinned ferromagnetic~~ electron-reflective layer comprises a tantalum oxide film formed from a tantalum layer having a thickness within a range of approximately 0.5 to 1.75 nm.
3. (Currently amended) The sensor of claim 1, wherein the electron-reflective layer ~~consists of~~ comprises an oxide.
4. (Currently amended) The apparatus sensor of claim 3, wherein the oxide is comprises a metal oxide.

5. (Currently amended) The ~~device according to~~ sensor of claim 4, wherein the metal oxide is formed by:

forming a metal film on the surface of the non-magnetic back layer; and
exposing the metal film ~~on the surface of the back layer~~ to an oxidizing atmosphere.

6. (Currently amended) The ~~device according to~~ sensor of claim 5, wherein the metal film ~~on the surface of the back layer is more readily oxidized~~ has a rate of oxidation that is greater than that of the non-magnetic back layer.

7. (Currently amended) The ~~device according to~~ sensor of claim 5 ~~further comprising forming wherein~~ the metal film with has a thickness within a range of approximately 0.5 to 1.75 nm.

8. (Currently amended) The ~~device according to~~ sensor of claim 1, wherein the non-magnetic back layer has a thickness within a range of approximately 0.5 to 1.5 nm.

9. (Currently amended) The ~~device according to~~ sensor of claim 1, wherein:
the non-magnetic back layer ~~is a metal; and~~
~~the metal acts as an oxidizing agent with respect to the electron-reflective~~
layer comprises Cu.

Claim 10 (canceled)

11. (Currently amended) An apparatus for sensing magnetic flux comprising:
a spin-valve type magnetoresistance sensor having:

a free ferromagnetic layer;

a pinned ferromagnetic layer;

a non-magnetic spacer layer ~~which is~~ sandwiched between the free ferromagnetic layer and the pinned ferromagnetic layer;

an anti-ferromagnetic layer ~~which is~~ disposed adjacent to the pinned ferromagnetic layer;

a non-magnetic back layer ~~which is~~ disposed adjacent to the free ferromagnetic layer ~~and which is stacked on the opposite a side of the free ferromagnetic layer from~~ opposite the non-magnetic spacer layer; and

an electron-reflective layer ~~which is~~ disposed adjacent to the non-magnetic back layer ~~and which is stacked on the opposite a side of the non-magnetic back layer from~~ opposite the free ferromagnetic layer.

Claims 12-20 (canceled)

A2
21. (New) A spin-valve magnetoresistance sensor, comprising:

a free magnetic layer;

a pinned magnetic layer;

a nonmagnetic spacer layer disposed between the free magnetic layer and the pinned magnetic layer;

an antiferromagnetic layer adjacent to the pinned magnetic layer, the pinned magnetic layer pinned by the antiferromagnetic layer; and

a non-magnetic back layer disposed adjacent to the free magnetic layer, the free magnetic layer adjoining and being disposed between the non-magnetic back

layer and the nonmagnetic spacer layer, the non-magnetic back layer having a thickness within a range of approximately 0.5 to 1.5 nm;

an electron-reflective layer that adjoins the non-magnetic back layer on a side of the non-magnetic back layer opposite the free magnetic layer.

22. (New) The spin-valve magnetoresistance sensor of claim 21, wherein the electron-reflective layer comprises a tantalum oxide film.

23. (New) The spin-valve magnetoresistance sensor of claim 21, wherein the tantalum oxide film is formed from a tantalum layer having a thickness within a range of approximately 0.5 to 1.75 nm.

24. (New) The spin-valve magnetoresistance sensor of claim 21, wherein the electron-reflective layer comprises a large band gap semiconductor material.

25. (New) The spin-valve magnetoresistance sensor of claim 21, wherein the non-magnetic back layer comprises two or more non-magnetic metal layers.